

CLAIM AMENDMENTS - CORRECTED

1. (Currently amended) In a [A] cross-laminate comprising mutually bonded films of which at least one pair of two [neighbour] adjacent films A and B are each [being] coextruded [films are] with an uniaxial [ly] [oriented] or unbalanced biaxial [ly] orientation with [ed], [whereby] the main direction of orientation [(2)] in film A crossing [es] the main direction of orientation [(3)] in film B and each film contains a main layer consisting of a polymer material [selected for] having high tensile strength [(hereinafter the main layer) and on each] , said main layers each having on [its] their mutually facing sides [which faces the neighbour film A or B] at least a first surface layer of a different polymer material, [characterised in that] the improvement wherein said first surface layer on the main layer of each of the films A and B is a discontinuous layer consisting of an array of coextruded thin strands [(101, 102)], the strands [(101)] in the arrays of the two films being arranged [to] in crossing relation to one another [the strands (102) in B], and the polymer material of said strands [consisting of a material which] is selected to modify a [the] property [ies] in the surface of the respective film [, this modification concerning] which relates to the optical appearance of the laminate, [or] the bonding between the films A and B, or a combination thereof [or both].

2. (Currently amended) A cross-laminate according to claim 1 [characterised in that] wherein the strands in the respective arrays are in contact with one another at their points of intersection and [A and B] are [strongly] bonded to each other at said points of intersection with a bond that is greater than the

bond between the remainder of the mutually facing sides of said films A and B. [in each spot (a) where a strand (101) on A intersects with a strand (102) on B, while A and B are weaker bonded or not bonded over the parts (b) of their contacting surfaces, where are devoid of any first bonding layer.]

3. (Currently amended) A cross-laminate according to claim 1 [or 2], [characterised in that the modification of the optical appearance is established through a selection of pigmentation in the first surface layer] wherein the polymer material of the strands of at least one of said arrays has added thereto pigmentation to thereby modify the optical appearance of the laminate.

4. (Currently amended) A cross-laminate according to claim 1 [any of the preceding claims, characterised in that] wherein the thickness of the strands in the surface layer of each of said films A and B [mounts at the highest to] is not greater than 30% [, preferably at the highest 20% and still more preferably no more than 10%] of the thickness of the respective film.

5. (Currently amended) A cross-laminate according to claim 1 [any of the preceding claims, characterised in that] wherein the collective width of the strands in each of said surface layers [films is selected to occupy at the highest] constitutes not more than 60% [, preferably at the highest 50% and still more preferably at the highest 30%] of the [surface] area of the respective film side.

6. (Currently amended) A cross-laminate according to claim 1 [any of the preceding claims characterised in that] wherein the thickness increase in each of said films A and B at the locations

where the strands are [coextruded amounts at the highest to] present is at most 30% of the film thickness in strand-free regions [seen relative to the immediate surrounding, preferably at the highest 20% and still more preferably no more than 10%].

7. (Currently amended) A cross-laminate according to claim 1 [or 2 characterised in that] wherein the distance from the [middle] center-to-center [middle] of [neighbour] adjacent pairs of strands in each array is between 2 mm and 80 mm[, preferably no higher than 40 mm, and more preferably no higher than 20 mm].

8. (Currently amended) A cross-laminate according to [to any of the preceding claims, characterised by] claim 1 comprising a second surface layer of a polymer material [(104, 105)] on at least one of the mutually facing sides of the main layers of [at least one of the neighbour] said adjacent films A and B [on the side of the main layer which faces the other one of the said neighbour films], the second surface layer being continuous and either located between the main layer and the first surface layer or on top of the first surface layer [, and preferably selected for control of the bonding between A and B].

9. (Currently amended) A cross-laminate according to claim 8 [characterised in that] wherein the second surface layer is between the main layer and the first surface layer and is selected to produce, [at locations (b) which are devoid of any] in regions of said mutually facing sides of said main layers which are free of said first surface [bonding] layer, a bonding between said regions which is of lower strength than the bonding in the [spots (1) where strands on A intersect strands on B] points of intersection of the strands in the respective arrays of films A and B.

10. (Currently amended) A cross-laminate according to claim 2, [characterised in that] wherein the bonding strength [in the spots] at said points of intersection, as measured by a peel[ing] test [,] carried out on narrow specimens of the cross-laminate at a velocity of about 1 mm sec⁻¹, is at least 40 g cm⁻¹ and the bonding strength in the strand-free remainder of said mutually contacting surfaces [parts of the contacting surfaces which are devoid of any first bonding layer], [similarly] determined by a similar test, is at the highest 75% [, and preferably no more than 50%,] of the bonding strength between the strands at said points of intersection [in the spots].

11. (Currently amended) A cross-laminate according to claim 1 [characterised in that] comprising an assembly of at least two [such] of said pairs of [array-bonded] films A and B , the films of each of said pairs having said surface layers on their mutually facing sides.

12. (Currently amended) A cross-laminate according to claim 11 [characterised in that] wherein said two pairs of said films share a common [one film is common for two such sets, this] film having an array of [the] said strands on both of its surfaces.

13. (Currently amended) A cross-laminate according claim 1 [to any of the preceding claims, characterised in that it] which comprises on at least one [or each] of its [the] outer films [of the laminate], a exterior surface layer [(106, 107) which also is surface layer of the laminate and is] adapted to enhance a surface property of the laminate selected from its heat-sealing capability [of the laminate and/or increase] or its frictional properties.

14. (Currently amended) A cross-laminate according to claim 1 wherein [any of the preceding claims, characterised in that] the main layer [at least] of each of [the] said two films A and B consists [mainly] essentially of polyethylene or polypropylene.

15. (Currently amended) A cross-laminate according to claim [14] 8, [characterised in that] wherein in each of said films A and B the main layer [consists of] is selected from HDPE, [or] LLDPE or a blend of the two, the second bonding layer is formed mainly [consists] of LLDPE [but with] in admixture [of] with 5 - 25% of a copolymer of ethylene having a melting point or a melting range within the temperature [interval] range of 50 - 80 °C, and the strands in the surface layers of said films is selected from a polymer which [mainly] consists essentially of a copolymer of ethylene having a melting point or a melting range within the temperature [interval] range of 50 - 100 °C or a blend of such copolymer and LLDPE containing at least 25% of the said copolymer.

16. (Cancel)

17. (Cancel)

18. (Currently amended) A cross-laminate according to claim 16 [or 17, characterised in that] which when viewed in [a] cross-section [perpendicular to] taken through the striations[, the maninate] exhibits a generally regular arrangement of ribs which are thicker than its [the] average thickness [of the laminate] and have a generally arcuate curvature in one direction perpendicular to its surface with the regions thereof adjacent to the rib boundaries being [concave and a generally convex surface to form a bending of the rib transverse of its longitudinal direction and in that the material in or adjacent to the boundaries of the ribs] in

the tensionless state [of the material are] bent in the opposite direction [to the rib to give the material] so that the regions between the boundaries of two adjacent ribs are [a] generally flat [straighten-out shape].

19. (Currently amended) A cross-laminate according to [any of the preceding claims and in which] claim 1 wherein the strands of said arrays bond strongly at their points of intersection [strong bonding is established where the strands intersect (a), while by means of] and each of said films A and B has a second surface layer interposed between the strand-formed first surface layer and the main layer thereof [in each of the films A and B], and each said second layer includes an adhesion modifying material to establish a weak bonding [or a blocking is established] between the contacting mutually-facing sides thereof in the strand-free regions [areas (b) which are devoid of stand material, characterised in that said weak bonding or blocking is established by means of the addition in the second surface layer of an adhesion aid, preferably a low molecular weight polyisobutylene or polypropylene].

20. (Currently amended) A cross-laminate according to [any preceding] claim 1 in which the first surface layer on at least one of said films A and[/or] B comprises at least two [or more] sets of strands, each said set being formed of a polymer material differing in [composition and/or colour] appearance from [the] every other set [(s)] and the strands of the sets being [offset with] interspersed with one another.

21. (Currently amended) A cross-laminate according to [any preceding] claim 1 wherein [, characterised in that] said first

surface layer on each of the films A and B occupies at the highest 15% [, preferably at the highest 10%, and more preferably at the highest 5%] of the volume of the corresponding [respective] film [A or B].

22. (Currently amended) A cross-laminate according to [any preceding] claim 1 [, characterised in that] wherein the average melting point of the polymer[s] material which constitutes the strand-formed first surface layer of each of said films A and B [,] is at least about 10° C [, preferably at least 15° C, and more preferably at least about 20°C] lower than the average melting point of the polymer[s] material which constitutes the main layer.

23. (Currently amended) In a [A] method of manufacturing a cross-laminate comprising mutually bonded polymer films of which at least two [neighbour] adjacent films A and B each are formed by coextruding in a flat or circular die a main layer of a polymer material [which is selected for] having high tensile strength and a first surface layer of [from] a different polymer material, and in which said films A and B are brought together in sandwich relation in said coextrusion die and each [is supplied with] has imparted thereto a uniaxial or unbalanced biaxial molecular orientation at any stage after being brought together in sandwich relation [the joining of the different materials in the coextrusion die and before the lamination, and prior to the lamination A and B are arranged in such a way that] with said [the] main directions of orientation in crossing relation [A will cross the main direction of orientation in B], and [during the lamination the bonding between] after being brought together, said films A and B [is established at least in part through] are subjected to heat to at

least partially establish bonding therebetween to form a laminate
, [characterised in that] the improvement comprising the steps of
coextruding [in the coextrusion] each of the said first surface
layers [is made] discontinuously in [the transverse] a direction
generally transversely of its main direction of orientation [,
whereby it consists of] to thereby form the layer as an array of
strands extending lengthwise generally in said main direction of
orientation in crossing relation to the strands of said other film,
and [A and B are arranged so that the array of strands on A cross
the array of strands on B, and further characterised in that]
selecting the polymeric material [from which] of the strands [are
extruded is selected] to modify [the] a surface property [ies in
the surface] of the respective film [, this modification
concerning] which relates to either the optical appearance of the
laminate or the bonding between said films A and B or a combination
thereof.

24. (Currently amended) A method according to claim 23
[characterised in that] wherein [in the lamination] during said
heating, the heat is applied generally evenly all over films A and
B and the selection of polymer materials for the main and first
surface layers is such that the heating creates strong bonds at the
points of intersection of the strands of the two films [adapted to
make the strands on A strongly bond to the strands on B in the
spots where they intersect the latter] but [make] at most a weak
[er] bonding between the strand-free contacting surfaces of the
main layers of said films [or avoid bonding over the parts of the
contacting surfaces, which are devoid of any first bonding layer].

25. (Cancel).

26. (Currently amended) A method according to claim 23 wherein said die is circular to form the cross-laminate as a tube, [25 characterised in that] the distance from center-to-center [the middle to middle] of adjacent [neighbour] strands at the exit from said die [the extruder] is at the highest 8 cm, [preferably no higher than 4 cm and more preferably no higher than 2 cm,] and the circumference of the tube at [this] said exit is at least 20 cm.

27. (Currently amended) A method according to [any of claims] claim 23 [to 26 characterised in that] wherein after said films are brought [following the bringing-] together [of the films] in [a] said sandwich arrangement [for lamination,] and before, after or simultaneously with [the bonding of said sandwich arrangement to a laminate by] being subjected to said heat, the films are further oriented by stretching in their longitudinal [and/] or [in the] transverse directions or both.

28. (Currently amended) A method according to [any of claims] claim 23 [to 27 characterised in that] which comprises the further step of coextruding [in the coextrusion process] along with said main and first surface layers for at least one of films A [and/] or B [is/are also supplied with] a continuous second [bonding] layer which is [coextruded on] disposed between the main layer [under] and the array of strands of said first surface layer, [whereby the] said second [bonding] layer being [consists] of a polymer material different from those in the main layer and the first [bonding] layer [,] and selected to produce, during the [lamination] heating step, bonding between the strand-free regions of the adjacent film surfaces [also at locations which are devoid of any first bonding layer, but a bonding] which is of lower

strength than the bonding in the points of intersection of said strands [spots].

29. (Cancel).

30. (Cancel).

31. (Currently amended) A method according to claim [any of claims] 23 [to 30 characterised in that] which further comprises coextruding a three-layer assembly having a film B coextruded on both of the opposite sides of a common film A, said film A having said first surface layer on each of its opposite sides and said films B having said first surface layer on at least the side thereof contacting a side of said film A, the arrays of strands of the first surface layer of each said film B intersecting with the array of strands of the surface layer of said film A proximate thereto. [arrays of strands of are coextruded on both sides of A and B films are arranged on both sides of A with the array on each film crossing the array on the respective side of A.]

32. (Cancel).

33. (Cancel)

34. (Currently amended) A method according to claim 62 [33] [characterised by] wherein the embossing step is carried out by [involving] passing [the] said films A and B [of the laminate, when] after they have been brought together in sandwich relation [for lamination,] and before or after [establishment of the bonding,] they have been subjected to said heating through at least one [or more pairs] pair of mutually intermeshing grooved rollers to form said corrugations and simultaneously effect a transverse stretching of the same [, by which the embossing step also stretches the laminate].

35. (Currently amended) A method according to [any of claims] claim 23 [to 34 characterised in that] including the step of controlling during the coextrusion the relative rates of flow of the polymeric materials of said main and first surface layers of each of said films A and B so that said first surface layer on each of the films A and B [occupies] makes up at the highest 15% [, preferably at the highest 10%, and more preferably at the highest 5%] of the volume of the respective film A or B.1

36. (Currently amended) A method according to [any of claims] claim 23 [to 35, characterised in that] wherein the average melting point of the polymer [s] material of [which constitute the] said strand-formed first surface layer of each of said films A and B [,] is at least about 10° C [,preferably at least 15° C and more preferably at least about 20 ° C] lower than the average melting point of the polymer [s] material of [which constitute] the main layer thereof.

37. (Currently amended) A circular extrusion die comprising a distribution section [part (8) in which] for forming at least a first molten polymer material [can be formed] into a generally even circular flow, and bodily separate from said distribution section [this] an exit [part (9)] section comprising a circular main channel [(12)] with generally cylindrical or conical walls [, which channel may comprise a flat zone,] for receiving said generally circular flow of said first polymer material and conducting the same to [to conduct said molten polymer material towards] an annular exit orifice to exit therefrom [which it will leave the die] as a tubular film structure [(16)], [characterised in that] said exit [part] section also comprising [es] a channel system

spaced radially from said main channel [(10)] for circumferential extrusion of a circular array of narrow strands of a second molten polymer material, said channel system ending in a circular row of internal orifices [(11)] opening into the [outward generally cylindrical or conical] wall of the main channel upstream of said exit orifice so that said circular array of said second polymer material merges with the circular flow of said first polymer material as circumferentially spaced lines superimposed on said circular flow.

38. (Currently amended) A circular extrusion die according to claim 37[, characterised in that] wherein said channel system for said circumferential extrusion begins [starts] at at least one [or a few] inlet [s (13)] in said [to the] exit section [part] and comprises for [equal dividing] delivering said second polymer to each said internal orifice a labyrinthine sub-channel system [(10) starting at] connected at one end to such [each] inlet and at the other to one of said circular array of orifices, [each such] said sub-channel system comprising at least three channel-branchings to promote a balanced division of polymer flow to said internal orifices.

39. (Cancel).

40. (Cancel).

41. (Cancel)

42 - 52. (Cancel).

53. (New claim) A cross-laminate according to claim 1, wherein the thickness of the strands in the surface layer of each of said films A and B is not greater than 10% of the thickness of the respective film.

54. (New claim) A cross-laminate according to claim 1, wherein the collective width of the strands in each of said surface layers constitutes not more than 30% of the area of the respective film side.

55. (New claim) A cross-laminate according to claim 1 wherein the thickness increase in each of said films A and B at the locations where the strands are present is at most 10% of the film thickness in strand-free regions.

56. (New claim) A cross-laminate according to claim 1 wherein the distance from the center-to-center of adjacent pairs of strands in each array is between 2 mm and 20 mm.

57. (New claim) A cross-laminate according to claim 2 wherein the bonding strength in the strand-free remainder of said mutually contacting surfaces, determined in the same manner, is not more than 50% of the bonding strength between the strands at said points of intersection.

58. (New) A cross-laminate according to claim 1 having a general thickness at the highest of about 0.3 mm, and wherein a film A is situated at one of its surfaces, said film A having its exterior surface corrugated to form a visible pattern of striations extending in one direction with the spacing of said striations in pattern being at the highest about 3 mm, the thin strands of said arrays on said film A are coloured, and the main layer of said film A is substantially transparent to enable the coloured strands to be visible when the laminate is observed from the A-side, the depth of the corrugations being sufficient that the strands appear at least about 0.5 mm distant from the striations to impart a three-dimensional effect.

59. (New) A cross-laminate according to claim 1 wherein , said first surface layer on each of the films A and B occupies at the highest 5% of the volume of the corresponding film.

60. (New) A cross-laminate according to claim 1 wherein the average melting point of the polymer material which constitutes the strand-formed first surface layer of each of said films A and B is at least about 20° C lower than the average melting point of the polymer material which constitutes the main layer.

61. (New) A method according to claim 26 wherein the distance from center-to-center of adjacent strands is not greater than 2 cm.

62. (New) A method according to claim 23 wherein the films A and B are coextruded with a film A on an exterior side of the final laminate, the polymer material for the first surface layer of said film A being colored and the polymer material for the main layer thereof being sufficiently transparent to render the strands of the surface layer visible therethrough, and coextrusion conditions are controlled so that the general thickness of the final laminate is not more than about 0.3 mm, which comprises the further step of embossing at least the exterior surface of said film A into corrugations forming a pattern of striations extending in one direction with corresponding thickness variations in said film, the divisions in said pattern being not more than about 3 mm and the corrugations having a depth sufficient that the strands appear to be at least about 0.5 mm distant from the striations to impart a three-dimensional effect.

63. (New) A method according to claim 35 wherein said first surface layer on each of the films A and B makes up at the highest 5% of the volume of the respective film A or B.

64. (New) A method according to claim 36 wherein the average melting point of the polymer material of said strand-formed first layer of each of said films A and B is at least about 20° C lower than the average melting point of the polymer materia of the main layer thereof.